MONTHLY NOTICES

OF THE

ROYAL ASTRONOMICAL SOCIETY.

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DR. J. W. L. GLAISHER, M.A., F.R.S., PRESIDENT, in the Chair;

Jnan Saran Chakravarti, M.A., Assistant Accountant-General, Allahabad, India;
Charles Sidney Mence, 49 Watling Street, London, E.C.;
Rev. John Stutter, O.S.B., Acton Burnell, near Shrewsbury; and
Ernest George Wainwright, B.A., St. John's College, Battersea, S.W.

were balloted for and duly elected Fellows of the Society.

The following Candidates were proposed for election as Fellows of the Society, the names of the proposers from personal knowledge being appended:—

Spencer Lavington Fletcher, 38 Lammas Park Road, Ealing, W. (proposed by Rev. W. J. B. Roome); and
Professor Monroe B. Snyder, Director of the Philadelphia Observatory, Philadelphia, U.S.A. (proposed by Dr. Isaac Roberts).

The following were proposed by the Council as Associates of the Society:—

Professor W. W. Campbell, Director of the Lick Observatory, San José, California, U.S.A.;
Professor Julius Scheiner, Astrophysical Observatory, Potsdam, Germany; and
M. Charles Trépied, Director of the Observatory, Algiers.

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Ninety-seven presents were announced as having been received since the last meeting, including, amongst others :—

A 9-inch Newtonian reflecting telescope and other astronomical instruments, formerly belonging to the late Canon Cross, F.R.A.S., presented by Mrs. Cross ; Die Triangulation von Java, Abtheilung VI., edited by J. A. C. Oudemans, presented in the name of the Government of the Netherlands by Professor Oudemans ; A. Laussedat, Recherches sur les instruments, les méthodes et le dessin topographiques, tome 2, presented by the author.

Formulæ and Tables for connecting Coordinates of Stars on Different Photographs, especially Different Plates of the Astrographic Chart. By H. H. Turner, D.Sc., F.R.S., Savilian Professor.

1. If (x_1y_1) are the rectilinear coordinates of a star on one plate, (x_2y_2) those of the same star on another, then generally

$$x_2=\frac{ax_1+by_1+c}{1+kx_1+ly_1}, \quad y_2=\frac{dx_1+ey_1+f}{1+kx_1+ly_1} \quad \ldots \quad (1)$$

where a, b, c, d, e, f, k, l are constants for the pair of plates. Of these eight constants k and l are known with sufficient accuracy as the approximate coordinates of one centre referred to the other, and the remaining six may be determined either (1) from the measures themselves directly, or (2) knowing (x_1y_1) in terms of standard coordinates for the first plate $(\xi_1\eta_1)$; also (x_2y_2) similarly in terms of $(\xi_2\eta_2)$ standard coordinates for the second plate ; and finally knowing $(\xi_2\eta_2)$ in terms of $(\xi_1\eta_1)$ from geometrical considerations, we can deduce the values of (x_2y_2) in terms of (x_1y_1).

It is important to be able to use both these methods. The second of them involves three numerical transformations which may be rather laborious ; and the present paper is an attempt to put these transformations into a simple form for the computer.

Mechanical Rule of Procedure.

2. A simple mechanical rule of combining two transformations such as

$$\begin{matrix} X=a_1x+a_2y \\ Y=b_1x+b_2y \end{matrix} \quad \text{with} \quad \begin{matrix} \xi=A_1X+A_2Y \\ \eta=B_1X+B_2Y \end{matrix}$$

has been found useful. The result is of course

$$\xi=(A_1a_1+A_2b_1)x+(A_1a_2+A_2b_2)y=\alpha_1x+\alpha_2y$$
$$\eta=(B_1a_1+B_2b_1)x+(B_1a_2+B_2b_2)y=\beta_1x+\beta_2y$$